

## Unit Planning Guide: Geometry Unit 2 of 8

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| <b>Unit Title:</b> Proofs | <b>Pacing (Duration of Unit):</b> 20 days |
| <b>Grade:</b> Geometry    | <b>Buffer Day(s):</b> 5 days              |

### Desired Results

#### Transfer Goals (Priority practice standards in **bold**)

*Students will be able to independently use their learning to:*

- MP.1. **Make sense of problems and persevere in solving them.**
- MP.2. **Reason abstractly and quantitatively.**
- MP.3. **Construct viable arguments and critique the reasoning of others.**
- MP.4. Model with mathematics.
- MP.5. Use appropriate tools strategically.
- MP.6. Attend to precision.
- MP.7. Look for and make use of structure.
- MP.8. **Look for and express regularity in repeated reasoning.**

#### Established Goals (2011 MA Curriculum Frameworks Standards Incorporating the Common Core State Standards)

#### Prerequisite Standards:

- **7.G.5-** Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problems to write and use them to solve simple equations for an unknown angle in a figure.
- **8.G.5-** Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the Angle-Angle Criterion for Similarity of Triangles.

**WIDA for English Language Learners**  
 Standard 1: ELLs **communicate** for **Social** and **Instructional** purposes within the school setting  
 Standard 3: ELLs **communicate** information, ideas and concepts necessary for academic success in the content area of **Mathematics**

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### Standards (Priority Standards in **bold**):

- **G-CO.9.** Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*
- **G-CO.10.** Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*
- **G-GPE. 4** Use coordinates to prove simple geometric theorems algebraically. *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, ) lies on the circle centered at the origin and containing the point (0, 2).*
- **G-CO.11** Prove theorems about parallelograms. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*
  - **G-CO.MA.11a.** Prove theorems about polygons. *Theorems include: measures of interior and exterior angles, properties of inscribed polygons.*
- **G-GPE.2** Derive the equation of a parabola given a focus and directrix.
- **G-GPE.5.** Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

In the lesson planning stage, teachers will need to differentiate lessons for ELLs. In order to accomplish this they will need: 1.) this curriculum map, 2.) a list of their ELLs and their proficiency levels, and 3.) appropriate language function expectations and scaffolds or supports.

Meaning (\*Mostly assessed through Performance Tasks/Assessments)

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| <p><b>Big Ideas:</b> (Statements and concepts written in teacher friendly language which reflect the important [but not obvious] generalizations we want students to be able to arrive at. These are used by the teacher to focus daily instruction.)</p> <ul style="list-style-type: none"> <li>• All theorems have been proven at one point in time to help us as mathematicians understand the world of mathematics.</li> <li>• All mathematical theorems are created from existing postulates and definitions.</li> </ul> | <p><b>Essential Questions:</b> (Questions which frame ongoing and important inquiries about the big ideas. They are written for students and used in daily instruction to help engage students in meaningful thinking.)</p> <ul style="list-style-type: none"> <li>• What does it mean to prove something? When is it necessary?</li> <li>• How are we as students thinking &amp; acting like mathematicians?</li> </ul> |
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| Acquisition (*Mostly assessed through traditional summative assessments)  |  |
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| <p><b>Knowledge:</b> Key basic concepts, facts, and key terms (written in phrases) students should be able to recall independently.</p> <p><i>Students will know ...</i></p> <ul style="list-style-type: none"> <li>• the difference between <b>inductive</b> and <b>deductive</b> reasoning</li> <li>• that <b>conditional statements</b> are used in logical reasoning ( if, then form: <b>converse, inverse, contrapositive</b>)</li> <li>• that geometric theorems and postulates can be used to prove ideas about lines, angles, <b>triangles</b>, and polygons.</li> </ul> <p><b>Bold words are key academic vocabulary</b></p> | <p><b>Skills:</b> The discrete skills and process students should be able to use independently.</p> <p><i>Students will be skilled at:</i></p> <ul style="list-style-type: none"> <li>• explaining inductive reasoning as a <b>conclusion</b> based on patterns and observations (<i>Comprehension</i>)</li> <li>• explaining deductive reasoning as a conclusion based on facts and definitions (<i>Comprehension</i>)</li> <li>• defining the <b>hypothesis</b> and conclusion of a conditional statement (<i>Knowledge</i>)</li> <li>• building conditional statements (<i>Application</i>)</li> <li>• deconstructing diagrams into simplified figures (<i>Synthesis</i>)</li> <li>• constructing formal and informal <b>proofs</b> (<i>Analysis</i>)</li> <li>• justifying proofs using appropriate postulates and theorems (<i>Evaluation</i>)</li> <li>• using coordinates to prove or disprove simple geometric theorems algebraically (<i>Application</i>)</li> <li>• determining mathematical <b>counter-examples</b> (<i>Application</i>)</li> </ul> |

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### Resource Suggestions:

GEOMETRY 2007

McDougal Littell

Chapter 2: Reasoning and Proof  
Quadrilaterals

2.1  
2.2  
2.3  
2.4  
2.5  
2.6  
2.7

Chapter 3: Parallel Lines and Perpendicular Lines

3.1  
3.2  
3.3  
3.6

3.4  
3.5

Chapter 4: Congruent Triangles Chapter 8:

4.1  
4.7

8.1